REMARKS

Claims 1-7 are pending. Claim 4 is canceled; claims 1 and 7 are amended and claims 8 and 9 are added.

The added limitations of claims 1 and 7 are supported by original claim 4, now cancelled, and the specification at page 5, line 32-page 6, line 30 of the specification, more particularly on page 6, lines 10-30.

As clearly defined in the amended claims 1 and 7, a distinguishing feature of the present invention resides in the use of the first HF signal and the second HF signal for determining the optimum focus bias.

The first HF signal is obtained by driving an actuator of an optical pick-up so that a laser beam projected from the optical pick-up is moved oscillatingly in a tracking direction, thereby intentionally creating a pseudo state resembling a state in which the tracking servo seems to be engaged but is not actually engaged. The first HF signal is obtained in such a state from data on-track positions of the optical disc in the tracking direction as shown in FIG. 1 of the appended sketch.
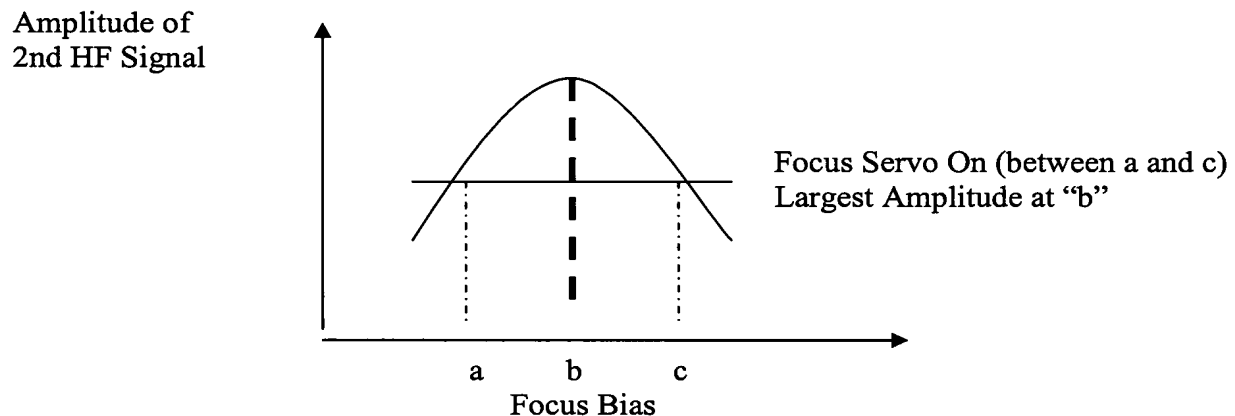
Further, the second HF signal is obtained by passing the thus obtained first HF signal into a peak/bottom holding circuit, which extracts an envelop of a peak-hold level waveform and a bottom-hold level. The second HF signal apparently looks like a signal obtained only from data of all the on-track positions of the optical disc as shown in FIG. 2 of the appended sketch.

The optimum focus bias is obtained based on the largest amplitude of the second HF signal by adding a focus bias the second HF signal so that the amplitude of the second HF signal is increased or deceased as shown in appended sketch FIG. 3. In this regard, it is to be noted that the second HF signal is obtained from an optical disc in which any data is recorded and a point at which the amplitude of the second HF signal becomes largest is easily obtained. Therefore, according to the present invention, it is possible to easily obtain an optimum focus bias.

In the present invention as claimed, the optimum focus bias is obtained through the following simple steps.

(S1)   Tracking Servo OFF and Focus Servo ON

(S2)   Rotating Optical Disc

(S3)   Supplying Actuator Drive Control Signal
        (Producing Pseudo State)

(S4)   Obtaining First HF Signal

(S5)   Passing First HF Signal into P/B Holding Circuit

(S6)   Obtaining Second HF Signal

(S7)   Adding Focus Bias to Second HF Signal to Increase or Decrease
        Amplitude

(S8)   Determining the Largest Amplitude of Second HF Signal

The largest amplitude of the second HF signal is obtained as follows.

Amplitude of
2nd HF Signal

Focus Servo On (between a and c)
Largest Amplitude at "b"

a   b   c
Focus Bias

In contrast, it appears that Abe (U.S. Pat. No. 6,049,513) does not teach or suggest signals corresponding to the first HF signal and the second HF signal. Further, in Abe, an optimum focus bias is obtained based on comparison between a traverse level of a tracking error signal (VTE) and a reference voltage (VREF), which is different from the present invention in which such a comparison is not carried out. Furthermore, Abe does not use any

equivalent of the peak/bottom holding circuit of the present invention for obtaining the traverse level of the tracking error signal. Therefore, in Abe, the following three patterns of the traverse level (FIG. 3A to 3C) are produced, and the complicated series of steps shown in FIG. 4 are required.

FIG. 3A

FIG. 3B

FIG. 3C

FIG. 4
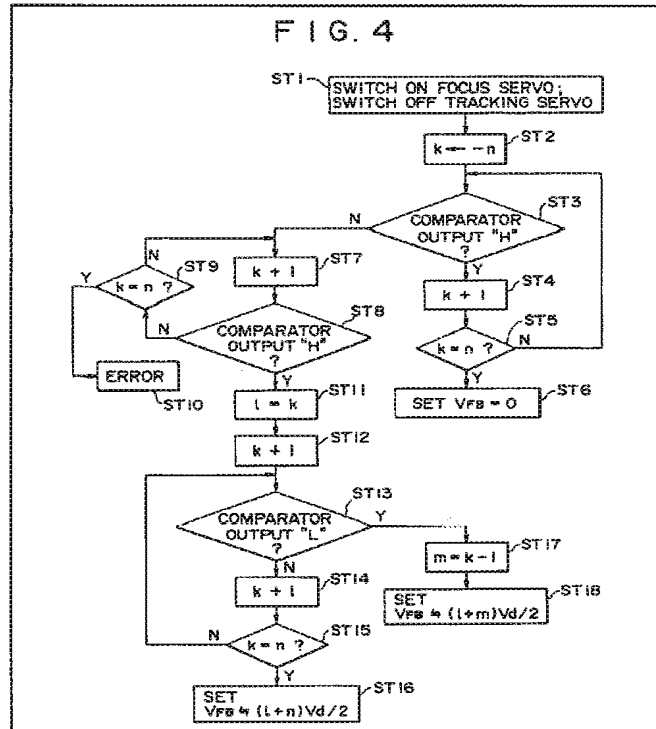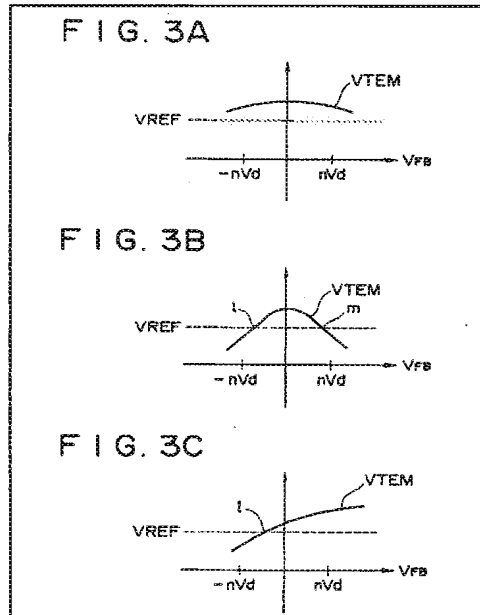
Therefore, Abe is patentably distinguished from the present invention.

In the § 103 rejections based on Abe in view of Park U.S. 6,049,513, the Examiner states with reference to claim 4 that Park teaches the method for adjusting a focus bias in an optical disc drive as claimed in claim 1, wherein the focus bias value is determined based on a signal obtained by passing the HF signal into a peak/bottom holding circuit (column 5, lines 20-51). However, in Park, the peak holding section 270 is provided for holding peak values of synchronizing signal 261 detected by synchronizing signal detecting section 260 and provides a held peak signal 271. The held peak signal 271 is provided to a step-delaying section 290 and a comparison section 300. Comparing section 300 compares the peak hold signal 291 delayed by the step-delaying section 290 with the peak signal 271 held by the peak holding section 270 and provides a comparison signal 301, so that the focus bias is adjusted based on the comparison signal 301. Therefore, the purpose of provision of the peak/bottom holding circuit of Park is completely different from the peak/bottom holding circuit of the present invention which is provided for producing the second HF signal as described above.

7

Further, in Park, the peak holding section 270 is provided for holding the peak values of the synchronizing signal 261 which is obtained from an RF signal in a state that both a focus servo and a tracking servo are engaged. Therefore, also in this point, the function of the peak holding section 270 of Park is completely different from that of the peak/bottom holding circuit of the present invention.

For these reasons, amended claim 1 is patentable over Abe and Park. Further, the same distinctions apply to amended claim 7 which includes the same limitation as added to claim 1.

Further, new dependent claims 8 and 9 further distinguish the subject matter of claim 1 from Abe and Park.

In view of the foregoing amendments and remarks, applicant believes the application should be in condition for allowance. If any questions remain, the Examiner is requested to call the undersigned.
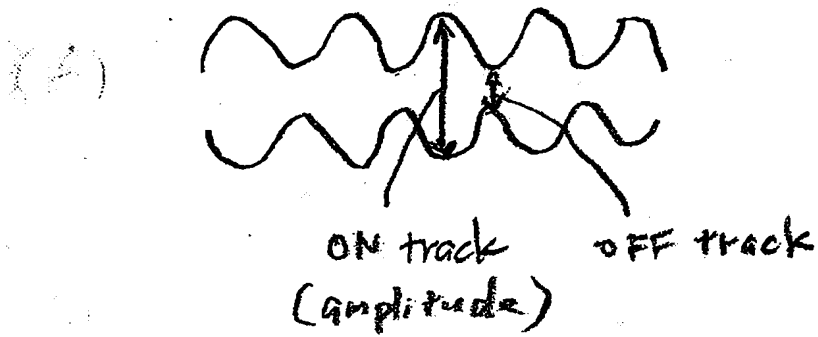
Respectfully submitted,

20575
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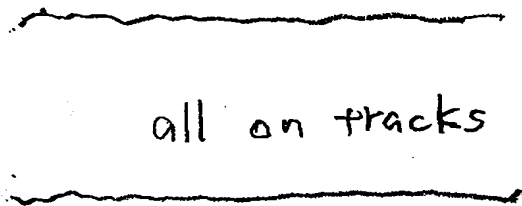Portland, Oregon 97204
Telephone: (503) 222-3613

FIG.1

(a)

ON track   OFF track
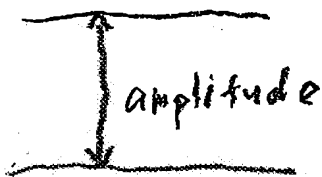(amplitude)

First HF Signal

⇩ Peak/Bottom circuit

FIG.2

(b)

all on tracks

Second HF Signal

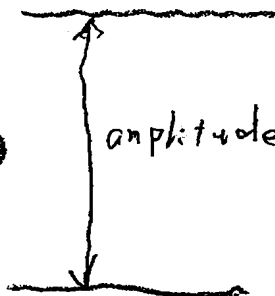⇩ Adding focus bias

FIG.3

(a) ⬍ amplitude   (b) ⬍ amplitude   (c) ⬍ amplitude